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WEATHER AND CIRCULATION OF FEBRUARY 1972

Warm and Continued Dry in the Far Southwest

ROBERT E. TAUBENSEE—*National Meteorological Center, National Weather Service, NOAA, Suitland, Md.*

1. MEAN CIRCULATION

Development of a blocking pattern over the northern latitudes of the Pacific Ocean was one of the primary features of the mean 700-mb circulation for February 1972 (figs. 1–3). This pattern was essentially the result of events that had begun during the latter half of January (Wagner 1972). Elsewhere around the hemisphere, major components of the mean 700-mb midlatitude wave train moved eastward from their January positions.

Although the mean midlatitude zonal wind index (10.9 m/s) remained above normal (+1.4 m/s), the index was down considerably from the record January value. This reduction was due in part to the amplified circulation over the Pacific Ocean.

The Bering Strait High continued to build during the month, with mean 700-mb height departures rising by more than 150 m. Its continued amplification during February was aided by midlatitude deepening of the mean trough over the western Pacific. Strong ridging accompanied several short waves emanating from the trough as they moved into the central Pacific along a depressed storm track south of the block.

Mean height anomalies fell as much as 164 m over the eastern Pacific as the January ridge in that area moved eastward to North America and a Low became established

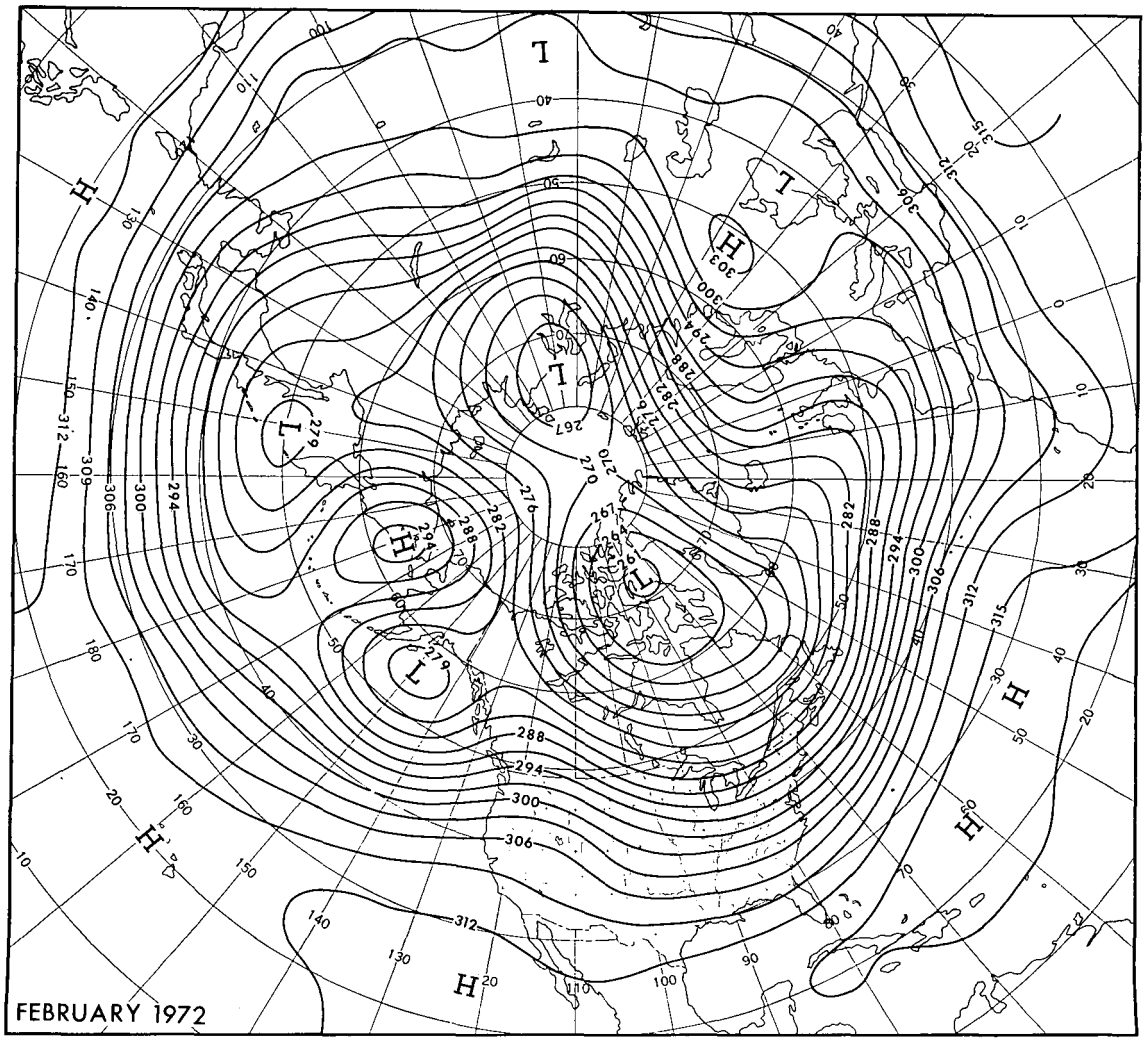


FIGURE 1.—Mean 700-mb contours in dekameters (dam) for February 1972.

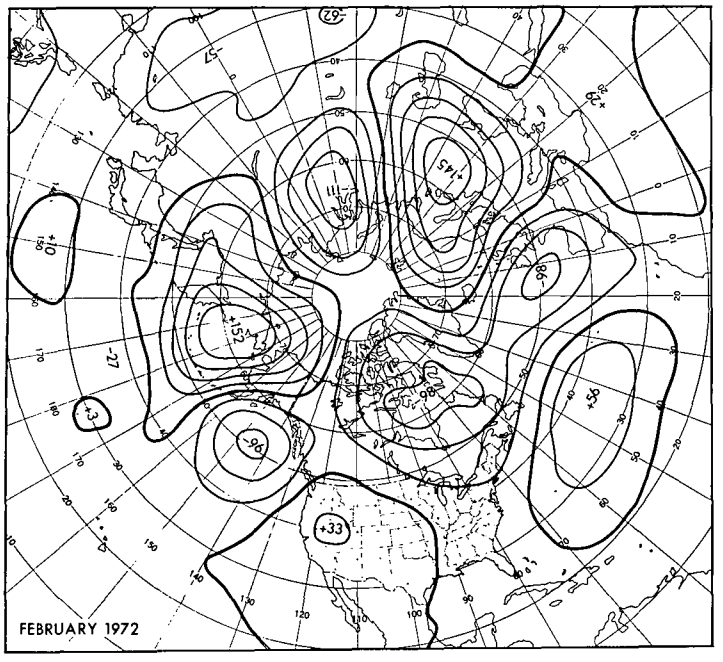


FIGURE 2.—Departure from normal of mean 700-mb height (m) for February 1972.

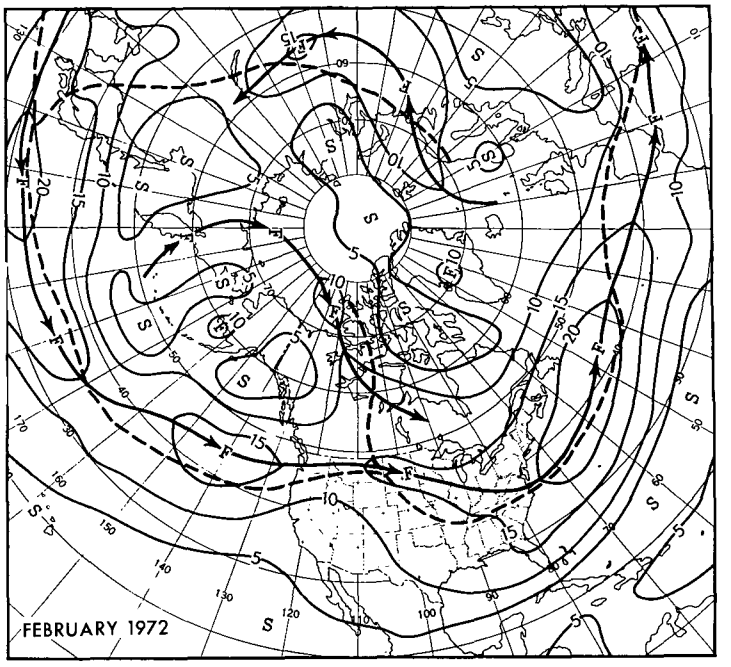


FIGURE 4.—Mean 700-mb geostrophic wind speed (m/s) for February 1972. Solid arrows show the observed axes of maximum wind speed, and dashed lines show the normal.

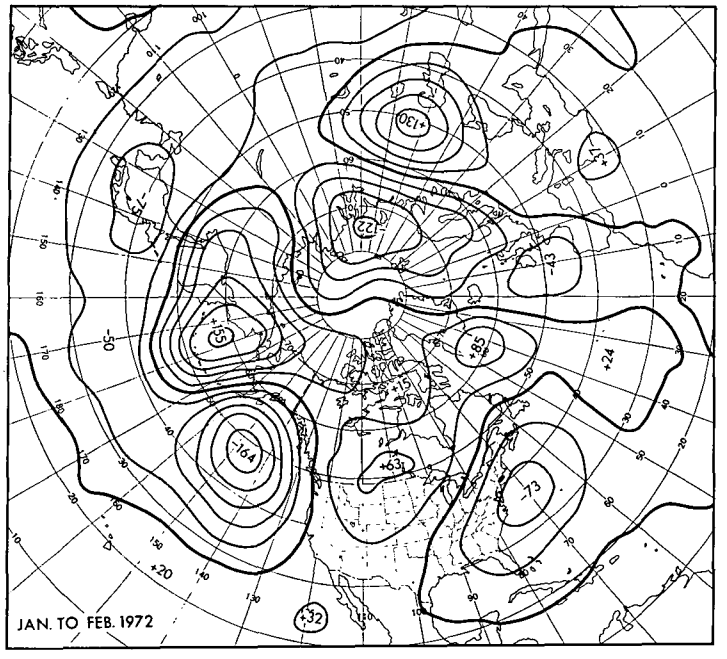


FIGURE 3.—Mean 700-mb height anomaly change (m) from January to February 1972.

in the Gulf of Alaska. Mean 700-mb heights in the Gulf were nearly 100 m below normal as northerly flow to the east of the Bering Strait High brought cold arctic air over the warm gulf water, enhancing cyclonic activity in that region.

Over North America, a mean ridge was located inland along the west coast from Manitoba, Canada, to California where it connected with the subtropical High in the southeastern Pacific. A deep Low continued to dominate the mean circulation in eastern Canada although it did weaken somewhat in February. Mean height anomalies rose over midcontinent and fell along much of the United States Atlantic coast as the mean trough accompanying the Canadian Low moved eastward.

Cyclonic activity was prevalent along the United States east coast this month and several surface systems, including the strongest storm of the winter, deepened rapidly on a path from the Carolinas to Newfoundland. Mean westerly winds southeast of Newfoundland remained strong this month as the flow along the 700-mb wind maximum reached 24 m/s, about 8 m/s above the normal value (fig. 4).

Eastward movement of the wave train downstream from North America is indicated by a midlatitude ridge over the central Atlantic. West of France, however, mean 700-mb heights were nearly 100 m lower than normal as a trough became established along the west coasts of Europe and North Africa.

The strong Scandinavian High of January moved southeastward in February, resulting in a negatively tilted ridge from the Spitsbergen Islands to western Russia. Mean height departures rose sharply near the Caspian Sea as a ridge replaced the January trough. This trough moved eastward and joined with a Low located near Novaya Zemlya.

2. TEMPERATURE

Mean surface temperatures over the United States during February 1972 (fig. 5) were higher than normal from the Pacific Coast southeastward into the Lower

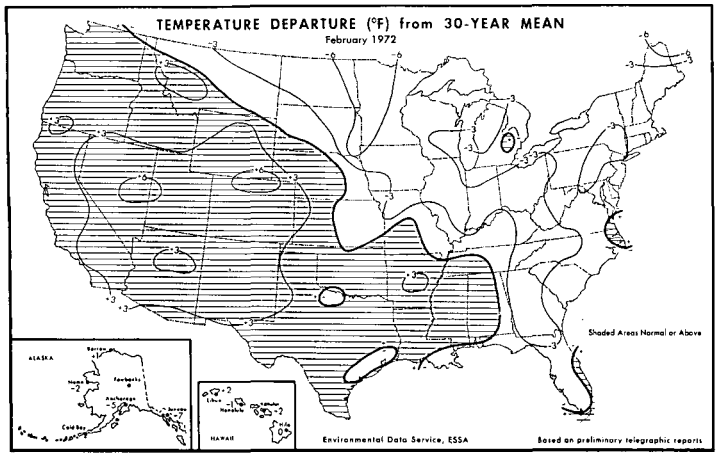


FIGURE 5.—Departure from normal of average surface temperature (°F) for February 1972 (from Environmental Data Service and Statistical Reporting Service 1972).

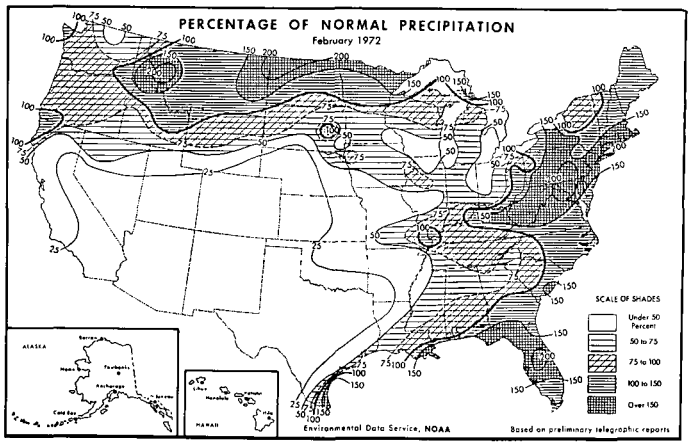


FIGURE 6.—Percentage of normal precipitation for February 1972 (from Environmental Data Service and Statistical Reporting Service 1972).

Mississippi Valley region in association with the west coast ridge. Elsewhere, temperatures averaged generally lower than normal. The excellent agreement of this temperature pattern with the mean 700-mb circulation can be noted by the great similarity between the anomaly patterns of the mean height and surface temperature (figs. 2, 5).

The temperature regime was not particularly persistent during February, and there was a notable absence of significant mean monthly station records.

Mean surface temperatures were well below normal over much of Alaska in connection with stronger than normal mean northerly 700-mb flow east of the Bering Strait.

3. PRECIPITATION

Total precipitation during the month was lighter than normal over much of the Nation (fig. 6) in association with the mean northwesterly flow aloft. Precipitation was heavier than normal, however, in the area from Idaho to Michigan as well as in the East along the Atlantic and gulf coasts.

Precipitation was very light, and in some cases nonexistent, over a large area of the Southwest. The strong western ridge shunted cyclonic activity well to the north of the normal track across the Central Rocky Mountains (Klein 1957).

Several stations reported record and near-record dryness for February (table 1). This dryness was a continuation of that of January, especially in the Far Southwest. Some parts of this region have had no measurable rainfall since December 1971, and four stations reported that this January–February period was the driest such 2 mo period in their history (table 2).

Most of the precipitation in the northern border states fell as snow in the wake of several surface systems that passed over the region. It was the snowiest February on record at Williston, N. Dak., and Sault Ste. Marie, Mich., with monthly snowfall totals of 16.5 in. and 41.3 in., respectively. At Sault Ste. Marie the 41 in. of snow on the ground at the end of the month was the greatest snow depth recorded there since records began in 1888.

Precipitation during February was heavier than normal over most of the East as a mean 700-mb trough remained over the region. Much of the precipitation was associated with typical winter season cyclonic activity over the

TABLE 1.—*Stations reporting record or near-record dryness during February 1972*

Station	Precip.	Remarks
	(in.)	
Ely, Nev.	0. 01	Driest Feb. on record
Milford, Utah	0. 01	do.
Cheyenne, Wyo.	0. 02	do.
Tucson, Ariz.	0. 0	Equaled driest Feb. of 1898
Grand Junction, Colo.	T	do.
Winslow, Ariz.	T	Equaled driest Feb. on record
Yuma, Ariz.	0. 0	do.
Roswell, N. Mex.	0. 0	do.
Phoenix, Ariz.	T	Equaled 2d driest on record
Las Vegas, Nev.	T	do.
El Paso, Tex.	T	do.

TABLE 2.—*Stations reporting record or near-record January–February dryness*

Station	Precip.	Remarks
	(in.)	
Flagstaff, Ariz.	0. 02	Driest Jan.–Feb. in 73-yr record
Phoenix, Ariz.	T	Only 3d Jan.–Feb. on record with no measurable precipitation
Tucson, Ariz.	0. 0	Driest Jan.–Feb. in 105-yr record
Winslow, Ariz.	T	Driest Jan.–Feb. in 58-yr record
Yuma, Ariz.	0. 0	First time no Jan.–Feb. precipitation since 1924
San Diego, Calif.	0. 17	Driest Jan.–Feb. since records began in 1850

warm water along the Atlantic coast. Most precipitation in Florida was in the form of showers and thundershowers accompanying several cold fronts that pushed into the State.

Alaskan precipitation was generally well below normal over most of the State in response to the effects of the blocking High over the Bering Strait.

4. WEEKLY VARIABILITY

During the week of January 31–February 6, mean temperatures over the Nation were very low, exceeding 15° F below normal in the Northwest and over the southern Appalachian Mountains (fig. 7B). The associated 700-mb pattern (fig. 7A) featured a ridge along the west coast and a trough over the East. The west coast ridge connected strongly with the Bering Strait High, and cold arctic air was transported southward into the country. The surge of cold air was sufficiently strong to bring freezing weather into Florida for the first time this winter season.

Mean 700-mb westerly winds strengthened over the eastern Pacific during the February 8–12 period as the Aleutian Low deepened and the subtropical ridge to the south strengthened (fig. 8A). The west coast ridge moved inland while downstream a trough was observed over the Great Plains States with a ridge to its east. The major east coast trough progressed into the western Atlantic.

Mean temperatures for the second week of February (fig. 8B) rose considerably from the Rocky Mountains westward to the coast as mild Pacific air was transported into the region. Mean temperatures remained well below normal east of the mountains, however, due to a strong Arctic outbreak at the beginning of the week.

Warm Pacific air continued to spread across the Nation during the week of February 14–20 as the mean 700-mb ridge in the West maintained its strength (figs. 9A, 9B). Strong westerly winds across the ridge displaced the downstream trough-ridge system to the east. Although the trough southward from the Great Lakes was deeper than normal, cold air was contained in Canada until late in the week. Then a surge of arctic air pushed southward into the East behind the worst snowstorm of the season along the East coast.

The mean 700-mb pattern over the Nation flattened considerably during the period February 22–26 (fig. 10A). Mean temperatures remained well above normal in the West as the warmth spread across the South to the east coast (fig. 10B). Temperatures cooled to below normal in the north-central States and over the Northeast as the huge Canadian Low brought arctic air to those areas of the Nation.

During the last two days of the month, record-breaking warmth covered much of the Nation with about 50 stations reporting record daily maximum temperatures on one or both of the days. At more than a dozen of these stations from the Rocky Mountains to the Ohio Valley, the temperatures were high enough to establish new record high temperatures for February.

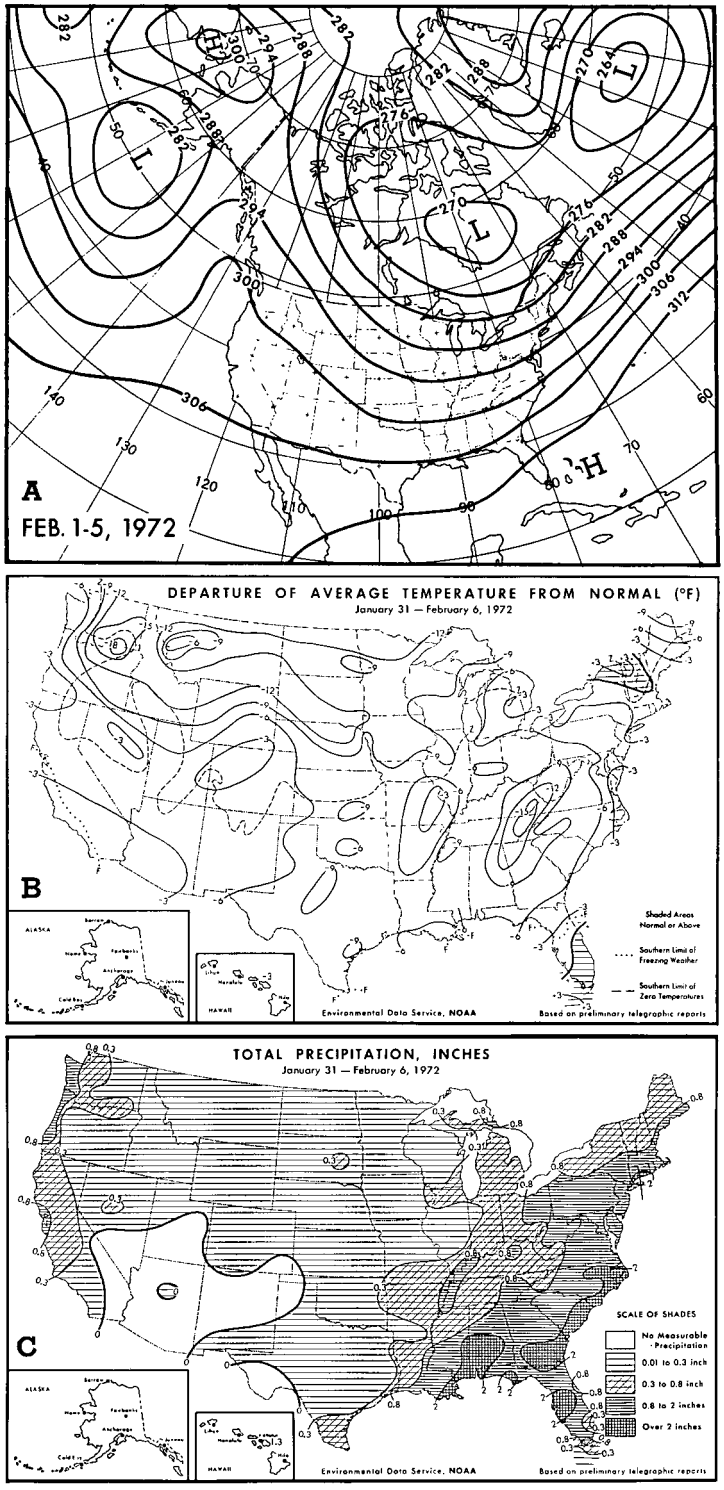
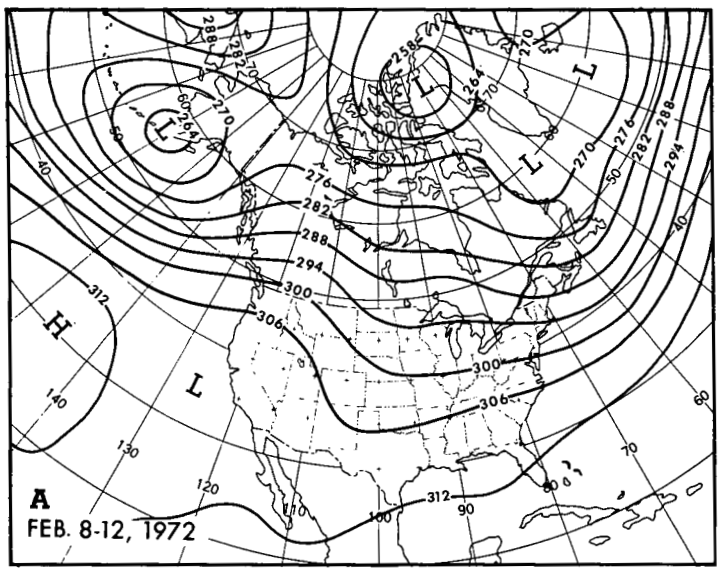
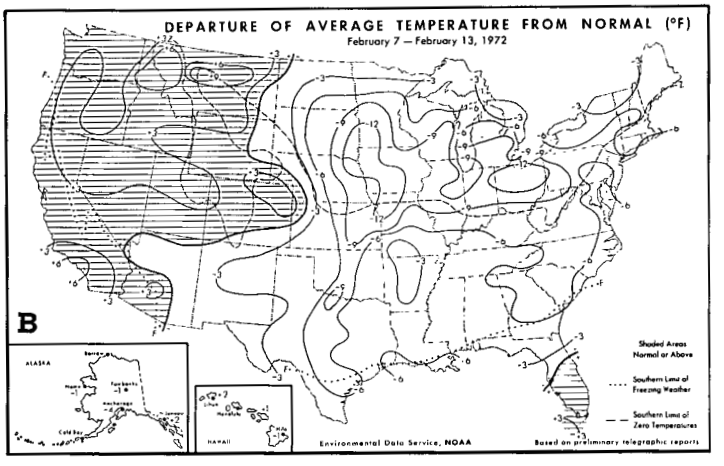


FIGURE 7.—(A) mean 700-mb contours in dekameters (dam) for Feb. 1–5, 1972; (B) departure from normal of average surface temperature (°F) and (C) total precipitation (in.) for week of Jan. 31–Feb. 6, 1972 (from Environmental Data Service and Statistical Reporting Service 1972).

Weekly precipitation throughout February (figs. 7C, 8C, 9C, 10C) was basically well related to the associated 5-day mean 700-mb height patterns. The area of dryness over the Southwest increased in size as the western ridge strengthened, reaching a maximum during February 14–20. Rainfall along the northwest coast became heavier





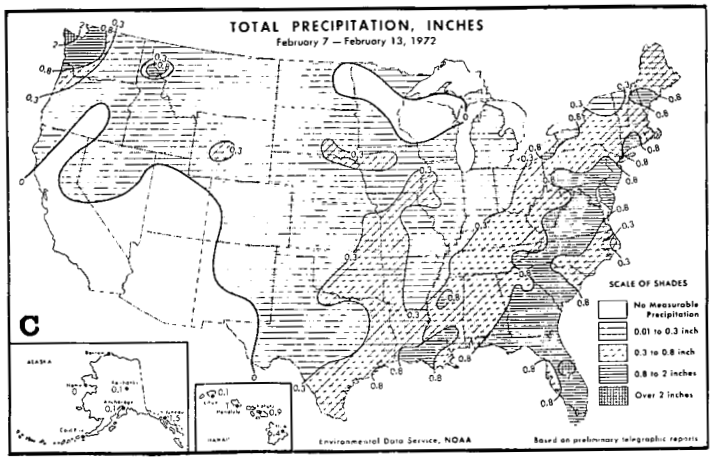
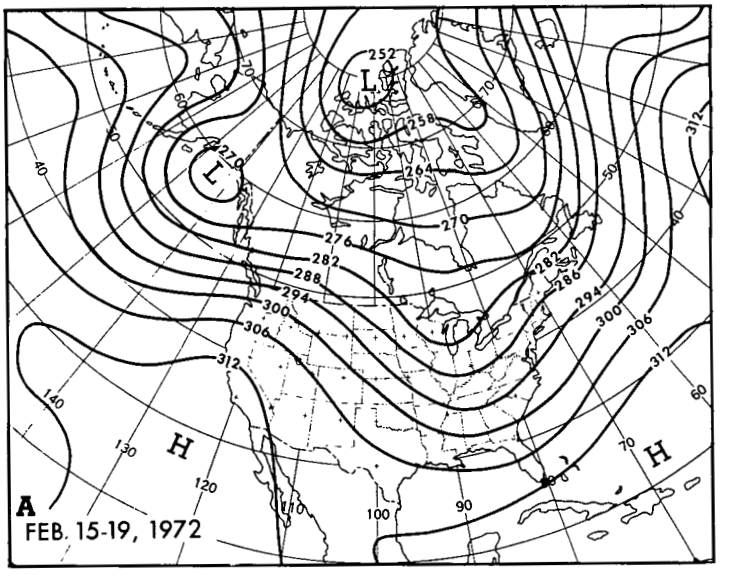
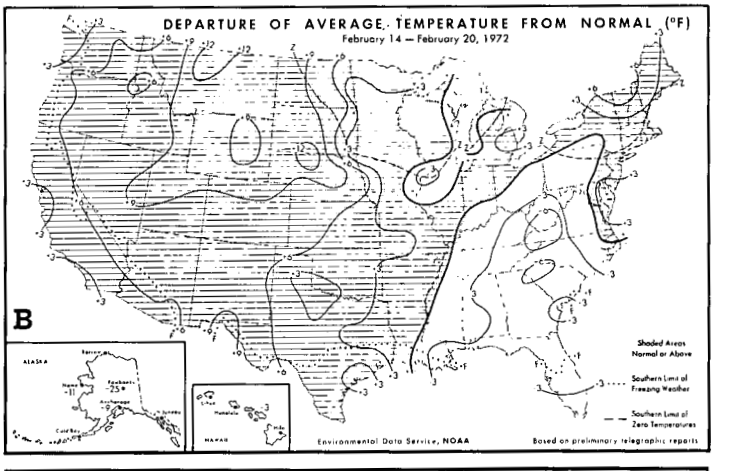


FIGURE 8.—Same as figure 7, (A) for Feb. 8–12, 1972; (B) and (C) for week of Feb. 7–13, 1972.





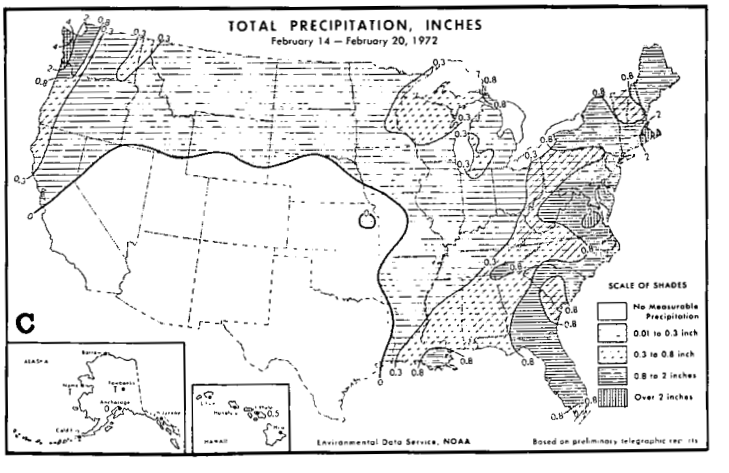


FIGURE 9.—Same as figure 7, (A) for Feb. 15–19, 1972; (B) and (C) for week of Feb. 14–20, 1972.

throughout the month as the mean 700-mb southwesterly flow along the coast strengthened and moved southeastward in conjunction with the approach of the Gulf of Alaska Low.

Weekly precipitation in the East was generally heaviest in the Southeast and along the Atlantic coast due to cyclonic activity along the coast. During the week of February 21–27, however, heaviest precipitation in the East was in the Kentucky–West Virginia region where weekly totals exceeded 4 in. This rainfall, combined with snowmelt and the failure of a coal slag dam, caused severe flooding along Buffalo Creek in West Virginia. About 3,000 homes were destroyed in 16 towns along the creek, and more than 100 fatalities were reported.

As previously noted, the worst storm of this winter season struck the East during the period February 18–20. The storm began as a weak Low over the southeast on the 18th. The Low began deepening rapidly off the Carolina

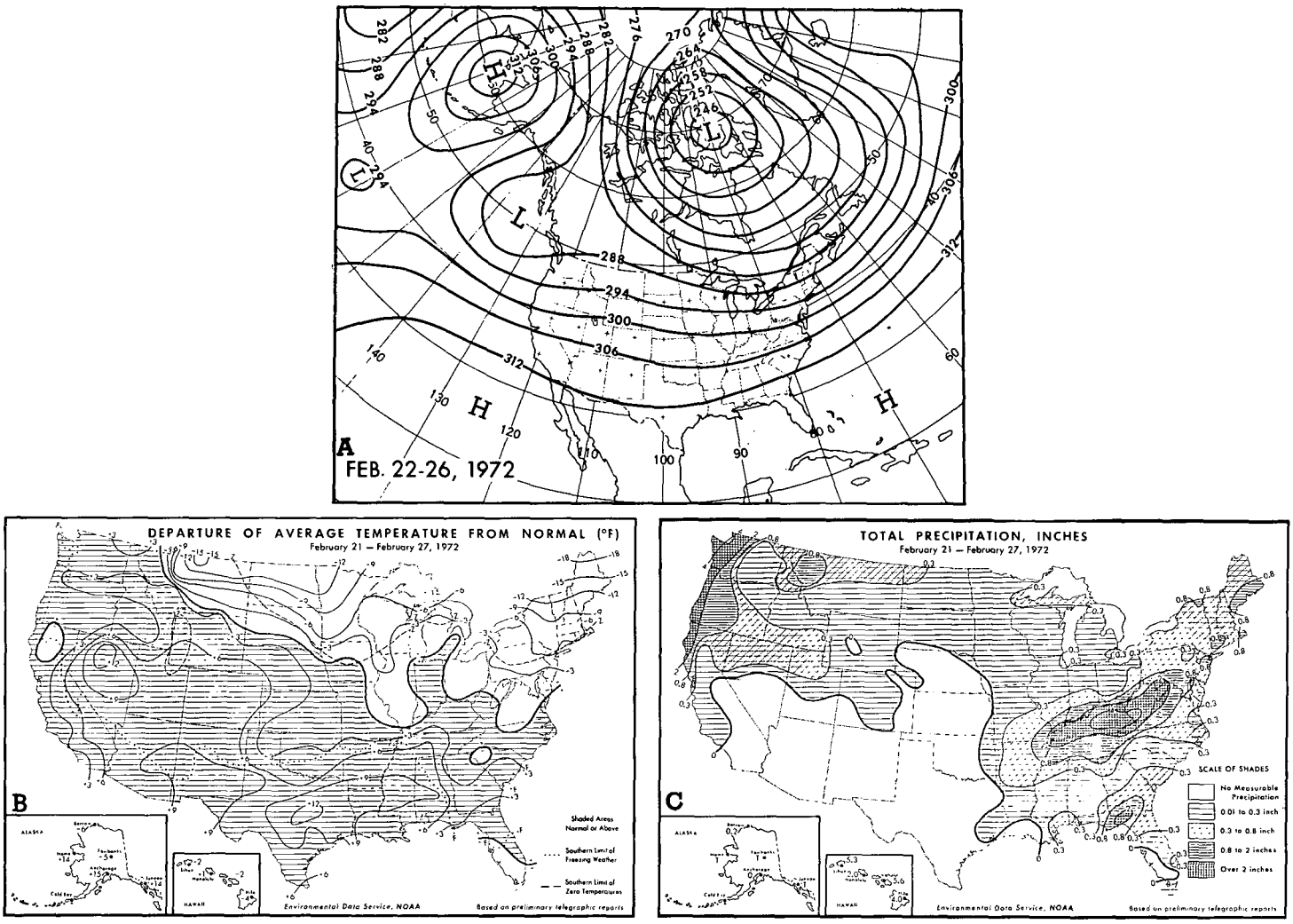


FIGURE 10.—Same as figure 7, (A) for Feb. 22–26, 1972; (B) and (C) for week of Feb. 21–27, 1972.

coast and moved northward along the coastline. Heavy snow, strong winds, and falling temperatures accompanied the passage of the storm northward from Virginia and West Virginia. In New England, strong easterly winds ahead of the storm caused high storm surge tides with resultant heavy damage to coastal property. The combination of heavy snow (up to 2 ft in some inland areas) and strong winds caused extensive drifting that isolated rural communities and left many homes without electrical power for as long as 3 days.

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